

ZOOLOGY 101 SECTION 12 LECTURE NOTES

Fishes

Phylum Chordata

Subphylum Vertebrata (Craniata)

Major groups of fishes: general breakdown

Agnathans = jawless fishes

Hagfishes

Lampreys

Gnathostomes = jawed fishes

Chondrichthyes = cartilaginous fishes

Osteichthyes = bony fish

Actinopterygii = ray-finned fishes

Sarcopterygii = fleshy-finned fishes

Lungfishes and Coelacanth

Superclass Agnatha: Jawless Fishes

- ~70 species
- Two classes
- Characteristics:
 1. Slender, eel-like body
 2. No paired appendages
 3. Fibrous or cartilaginous skeleton; notochord persistent
 4. Lack jaws, internal ossification, scales and stomach
 5. Pore-like gill openings
 6. Heart with one atrium and one ventricle; aortic gill arches

7. Dorsal nerve cord and brain; 8-10 pairs of cranial nerves
8. Sense organs of taste, smell, and hearing
9. External fertilization

Class Myxini: Hagfishes

1. Entirely marine, scavengers
2. Biting mouth with two rows of reversible teeth
3. Three accessory hearts in addition to main heart
4. 5-16 pairs of gills and a single pair of gill openings
5. One kidney anteriorly and one kidney posteriorly
6. Eyes poorly developed
7. Partially hermaphroditic, no larval stage

Class Cephalaspidomorpha: Lampreys

1. Marine and freshwater
2. Parasitic and non-parasitic forms
3. Sucker-like oral disc with rasping teeth
4. Only one heart
5. 7 pairs of gills each with a gill opening
6. One kidney only
7. Eyes moderately developed
8. Separate sexes with long larval stage and radical metamorphosis

Superclass Gnathostomata: Jawed Fishes

Class Chondrichthyes: Cartilaginous Fishes

1. ~800 species
2. Bone entirely absent

Subclass Elasmobranchii: Sharks, Skates, and Rays

- Body fusiform with heterocercal caudal fin
- Ventral mouth with jaw
- Skin of placoid scales; teeth modified placoid scales
- Endoskeleton entirely cartilaginous
- J-shaped stomach; intestine with valve
- Two chambered heart with several pairs of aortic arches
- 5-7 pairs of gills with separate and exposed gill slits, no operculum
- No swim bladder or lung
- High concentration of solutes (urea) in blood
- Well-developed brain and nervous system
- Separate sexes, internal fertilization

Form and Function:

Sharks as predators

Dermal placoid scales tough, leathery

Teeth are shed and replaceable

Must continuously swim or sink and drown

Keen sense of smell

Lateral Line System = "distance touch" system for detecting vibrations in the water; composed of canals alongside body and overhead; *neuromasts* = receptor organs highly sensitive to vibration and water current

Ampullae of Lorenzini = organs located in a shark's head that can detect the bioelectric fields generated by and surrounding living animals

Skates and rays noted for dorso-ventrally flattened bodies and large pectoral fins, dorsal spiracles for influent water - ventral gills

Subclass Holocephali: Chimaeras

- Mixture of shark and bony fish characters

Class Osteichthyes: Bony Fish

1. Some bone in skeleton and/or scales
2. Operculum covering gills
3. Lungs or a swim bladder

Subclass Sarcopterygii: Fleshy-lobed Finned Fish

- Muscular lobed fins
- Use lungs in gas exchange
- Lungfishes and Coelacanth

Subclass Actinopterygii: Ray-finned Fishes

- Fins with bony rays, lack muscular lobes
- Usually possess swim bladders, no lungs
- General fish